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HAYWARD, George
Some account of the first use of sulphuric ether by inhalation in surgical practice. 1847.

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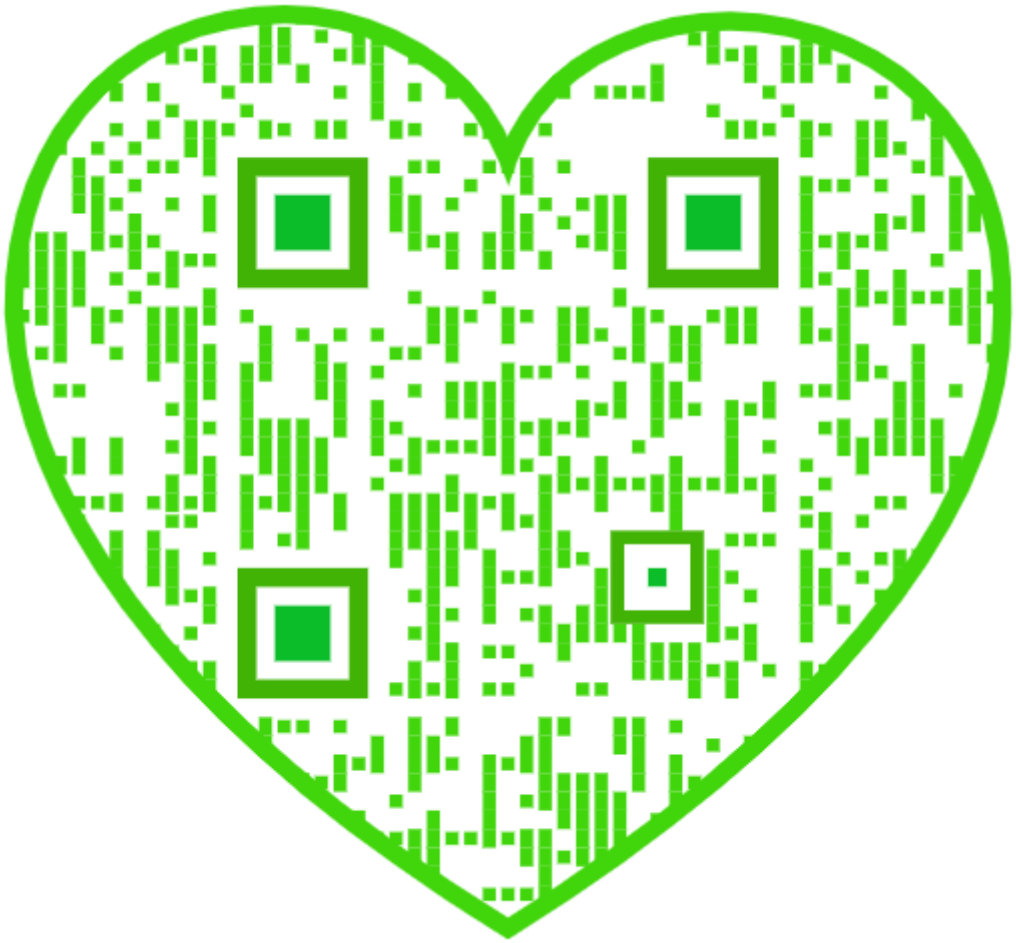

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SULPHURIC ETHER BY INHALATION

IN SURGICAL PRACTICE.

By GEORGE HAYWARD, M. D.

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IN SURGICAL PRACTICE.

By GEORGE HAYWARD, M. D.

[Read before the Boston Society for Medical Improvement, April 12th, 1847.]

That most persons can be rendered insensible to the pain of surgical operations by inhaling the vapor of sulphuric ether, is now well established. The safety of so doing can hardly be questioned, when it is known that it has probably been used in this way by several thousand individuals in this city within the last six months, without a fatal, and I believe I may add, an alarming result, in a single instance. Ill consequences, too, are most likely to be met with when a powerful agent, like this, is first getting into use, before all its properties are well understood, and before the best mode of administering it has been ascertained. That some unpleasant cases have occurred, there is no doubt; that it has failed to produce the desired degree of insensibility in a few others, is certain; but in no instance of which I have heard, has there been any serious or untoward effects that continued for any length of time.

At the same time it must be admitted that a great degree of caution is required in its administration, and it therefore can only be regarded safe in the hands of scientific and skilful persons. The dangers seem to me to arise principally from two sources. First, from allowing the inhalation to be too long continued; and secondly, from not adopting suitable means by which the lungs can be well supplied with atmospheric air, while the inhalation is going on.

With regard to the first, it may be observed, that it hardly admits of a doubt, that the peculiar state of the system that is produced by the vapor of ether when breathed, is that of narcotism; similar to what is sometimes

caused, though usually in a less degree, by wine, alcohol, and various medicinal agents. The effects, therefore, being on the brain and nervous system, it is obvious that if it be long kept up, and carried to a great extent, alarming symptoms would be likely to ensue. But for how long a period it can be safely inhaled, has not yet been ascertained.

In respect to the second source of danger, it is very apparent that if the lungs be not well supplied with atmospheric air, the blood cannot be perfectly arterialized, and, of course, a greater or less degree of asphyxia will be the consequence. This, however, can be easily guarded against, by having the inhaling apparatus so arranged, that the patient shall at each inspiration obtain an abundant supply of atmospheric air, while means are at the same time adopted to have this air well charged with the vapor of the ether. In this way the state of narcotism is in most cases readily induced, while that of asphyxia is entirely avoided.

It is not pretended, however, that there may not be circumstances in some cases, that would forbid the use of the ether altogether. It would not probably be deemed prudent to allow it to be inhaled by persons who have had hemorrhage from the lungs, or by those who were strongly predisposed to it; and it would perhaps be hardly safe to administer it to individuals who have formerly been or were at the time affected with mania, epilepsy or hysteria.

Children, from the great development of the nervous system in the early periods of life, are sometimes affected unpleasantly by the inhalation of the ether.

But on all these points there is yet much to be learnt. It is only surprising that so much has been ascertained in relation to the subject, when it is recollected that the first experiments with ether for surgical purposes were made but little more than six months ago.

It is well known that surgeons have for a long time sought to discover means of lessening, in some degree, if they could not altogether prevent, the pain of surgical operations; but their efforts were unsuccessful, and the world is indebted to individuals, not strictly of the surgical profession, for a discovery that will do more than any other to lessen human suffering. I believe I am warranted in saying that this remarkable property of ether, when taken into the human system by inhalation, of rendering surgical operations painless, was discovered in this city, and that the first successful application of it was made here in September last by Dr. Morton, a distinguished dentist. He extracted teeth from several individuals who were made insensible and unconscious in this way, without any subsequent ill effects.

It is understood that Dr. C. T. Jackson, well known by his great

attainments in geology and chemistry, first suggested the use of the ether; but to Dr. Morton, I think, must be awarded the credit of being the first who demonstrated, by actual experiment on the human subject, the existence of this wonderful property. Having satisfied himself that teeth could be extracted without pain from those who had previously inhaled the ether, he was desirous of having it tried on patients who were to undergo longer and more severe surgical operations. For this purpose he applied, about the middle of October last, to have it used at the Massachusetts General Hospital, and Dr. J. C. Warren, the attending surgeon at the time, at once consented.

The ether was administered at the Hospital by Dr. Morton on the 16th of October to a man upon whom Dr. Warren was to operate for a tumor on the face. The effect in this case was not complete; the suffering, however, was very much less than it would have been under ordinary circumstances, and the result was on the whole so satisfactory, that a second trial was made on the following day.

The patient to whom the ether was administered on the 17th of October was a female, with a fatty tumor on the arm, between the shoulder and the elbow. At the request of Dr. Warren, I did the operation. The patient was insensible during the whole time, and was entirely unconscious. The operation lasted about seven minutes, but could not be regarded as a very severe one.

These are the first surgical operations, except those of dentistry, that were ever performed on patients while under the influence of the ether.

On the first of November I took charge of the surgical department of the Hospital, and on the following day, in conversation with Dr. Warren, I stated that I did not intend to allow the surgical patients to inhale this preparation of Dr. Morton (for we were then ignorant of the precise nature of it) during my period of service, unless all the surgeons of the Hospital were told what it was, and were satisfied of the safety of using it. Dr. Warren agreed with me as to the propriety of this course.

On the 6th of November, Dr. Morton called at my house, and asked me if I was willing to have his preparation inhaled by a patient, whose limb I was to amputate on the following day. I told him of the conversation I had had with Dr. Warren on the subject. Dr. M. at once said that he was ready to let us know what the article was, and to give to the surgeons of the Hospital the right to use it there when they pleased. He added, that he would send me a letter in the course of the day to this

effect. I requested him to address it to Dr. Warren, as he was the senior surgeon, and told him that I would submit it to my colleagues at a consultation to be held on the following morning. He wrote the letter accordingly; the subject was maturely considered by the surgeons, who were unanimously of opinion that the ether should be inhaled by the individual who was to undergo the operation that day.

The patient was a girl of 20 years of age, named Alice Mohan, who had suffered for two years from a disease of the knee, which terminated in suppuration of the joint and caries of the bones. For some months before the operation her constitutional symptoms had become threatening, and the removal of the limb seemed to be the only chance for her life. The ether was administered by Dr. Morton. In a little more than three minutes she was brought under the influence of it; the limb was removed and all the vessels were tied but the last, which was the sixth, before she gave any indication of consciousness or suffering. She then groaned and cried out faintly. She afterwards said that she was wholly unconscious, and insensible up to that time, and she seemed to be much surprised when she was told that her limb was off. She recovered rapidly, suffering less than patients usually do after amputation of the thigh, regained her strength and flesh, and was discharged well on the 22d of December.

On the same day Dr. Warren removed a part of the lower jaw. There was but little if any pain in the first part of the operation; but as it was necessarily protracted, the sensibility was in some measure restored before it was over, and from the situation of the part operated upon, it was of course impossible to allow the patient to inhale the ether a second time.

The favorable effects of the inhalation of the ether in these cases, induced the surgeons of the Hospital to continue to employ it freely from that time to the present, both in that institution and in private practice; and I may add, that they have done so without any serious accident in a single instance, and with the happiest results in most cases. Besides many other operations performed there by Dr. Warren and myself, several were done in the course of the winter, on patients who had inhaled the ether, by our colleagues, Drs. Townsend, J. Mason Warren, S. Parkman and H. J. Bigelow.

It is unnecessary, however, to enumerate these, as no one can doubt the power of ether to render most persons insensible to pain, who has read the accounts of what has been done with it both in this country and

Europe, and as my object in drawing up this paper is merely to state the facts in the order in which they occurred, in relation to its first introduction into surgical practice.

I ought, perhaps, to add, that in four cases the experiments with the ether did not produce the desired effect. Two of these occurred to me at the Hospital, and the other two in private practice. The first of these was that of an elderly lady, upon whom I was about to operate for disease of the breast. She attempted to inhale it for a length of time, but it had no influence upon her. It was afterwards ascertained that there was a defect in the apparatus that was used, and that none of the vapor of the ether entered her lungs.

The second case was that of a man with a fistula in ano, who was extremely sensitive, and apparently suffered very much from the slightest examination. After inhaling the ether for a short time he became violent, like a person in a drunken delirium, so that it was not easy to control him. I was able, however, to go through with the operation, though not without some difficulty. The violent symptoms lasted for a few minutes only. He afterwards said that his suffering had not been great, and that he felt as if he had drunk alcohol to excess.

The third case was that of a young, married lady, who had a tumor, not of a malignant character, in the breast. She was of a nervous, excitable temperament, and did not inhale the ether readily. After some time she became apparently insensible, and she evidently did not feel the first incision. But as soon as I began to dissect the tumor from the surrounding parts, she struggled so violently as to render it difficult to go on with the operation. It was fortunately completed, however, without any unpleasant occurrence.

Both of these cases happened at an early period, when our experience with the ether was quite limited. I am now satisfied, that if the inhalation had been longer continued, the desired effect would have been produced.

The fourth case was that of an elderly woman, whose limb I amputated below the knee at the Hospital in January last. She inhaled the ether without difficulty, and was insensible during the first part of the operation. She, however, soon became slightly convulsed, her countenance assumed a livid appearance, and the blood that flowed from the incisions was darker colored. The mouth-piece of the apparatus was at the time in her mouth, and her nose was compressed by an assistant. The apparatus was immediately removed, and almost at the same moment she gasped, made a full inspiration, and her consciousness and sensibility were restored. She was in a state of partial asphyxia ; and on examining the apparatus,

which was used that day for the first time, it was found that the air did not enter into the receiver which held the ether without breathing very forcibly, more so than the patient was able to do. So that in fact she got no air into her lungs after she had exhausted that contained in the vessel from which she inhaled the vapor. This is an accident so easily guarded against, that it will not probably happen again. The unpleasant symptoms in this case passed off in a few moments, and the patient did well.

If it should hereafter appear that no other ill effects than those that have been already noticed will be likely to occur from the inhalation of the ether, it will be impossible to overrate the value of the discovery of its applicability to the purposes of the healing art. The mere power that it possesses of rendering surgical operations painless, puts it above all price; but this is by no means its only advantage. It disarms the operative part of our calling of the terror with which it is uniformly regarded by patients; it enables the surgeon to operate with more safety, ease and rapidity; it prevents, in great measure, the shock which the nervous system experiences from severe and protracted operations, and which not unfrequently destroys the chance of recovery; and in addition to these, it will enable surgeons sometimes to operate under circumstances and in situations where it could not have been done, if the patient had been in the ordinary state. In my short experience with the ether, I have already had an opportunity of witnessing its benefits in each of these different ways.

Its power of producing insensibility has been seen in most of the cases in which I have tried it.

I have operated on patients whose sufferings have been mitigated, and whose lives will no doubt be prolonged by the operation, who would not have submitted to it under ordinary circumstances; and it will be readily believed, that a surgeon will operate with more coolness when he is confident that he is giving no pain, and he certainly can do it more safely, and with greater rapidity, when the patient is entirely at rest.

There is reason to believe that the young woman before spoken of, whose limb was removed at the Hospital after she had inhaled the ether, would have sunk from the combined influence of her previous debility and the shock of the operation, if she had retained the ordinary degree of sensibility.

But there are still other advantages. We sometimes meet with cases where the parts are so morbidly sensitive, or where they are so peculiarly situated, that an operation could not be performed in the usual condition

of the system. Both of these cases have occurred to me within the last few weeks.

The first of these was that of a medical friend in a neighboring town, who had suffered for several months with a disease of the side, supposed to be connected with caries of a rib. But the part was so sensitive that he could not bear the degree of examination necessary to ascertain the precise nature of the trouble. In fact, the slightest pressure there produced violent and spasmodic pain. He inhaled the ether, but was brought only partially under the influence of it. He retained his consciousness entirely, but the sensibility was so much lessened that he allowed me to cut down upon the diseased rib, and remove a portion of dead bone. He suffered but little in the first part of the operation, and probably would not have suffered at all during the whole of it, if he had been willing to have inhaled the ether a little longer.

About a month since, I operated on a patient for a vesico-vaginal fistula, which I am confident could not have been done had it not been for the insensibility and relaxation induced by the inhalation of the ether. The fistula was in the fundus of the bladder, and before the ether was inhaled it was found impossible to force the bladder down, so as to bring it within the reach of any instruments which would be required for the operation, and the slightest examination caused extreme suffering. After the patient had inhaled the ether three minutes, the parts became very much relaxed and entirely insensible, so that I brought the fistulous opening down to the os externum, by means of a piece of whalebone carried into the urethra. In this situation I pared the edges of the fistula, closed it with two stitches, removed the whalebone, introduced a large catheter into the bladder, and then returned the organ to its natural situation, without giving the patient the least pain, and without her being in the slightest degree conscious. The whole time, from the beginning of the inhalation to the completion of the operation, was twenty-one minutes, and I have never been able to do the operation before in much less than an hour. The ether was administered in this case by means of a sponge well saturated with it, which was held to the nose and mouth, and re-applied occasionally whenever there was any indication of returning sensibility.

This I believe is the first instance in which a fistula in the bladder in this situation has been operated on, except, perhaps, by cautery ; and I am confident, though this first attempt may not be successful, that the patient can in this way be ultimately very much relieved, if not entirely cured of one of the most distressing infirmities with which human nature is afflicted.

I cannot close this article without saying, that all the patients on whom I have operated while under the influence of the ether, have recovered, and I should think more rapidly than they would have been likely to have done under ordinary circumstances. In no instance that I have seen, has there been headache or any cerebral symptoms after the inhalation, nor have I been able to discover any unpleasant effect from it. How far and in what cases it will be used in the practice of medicine, it is not easy now to determine; but that it will be employed by physicians to a great extent, I have no doubt.

Boston, April 12th, 1847.

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